Memorandum

To: *Diane Salkie, EPA Region 2*
Elizabeth Franklin, USACE

From: *Yeqing Liu, CDM Smith*
Keegan L. Roberts, Ph.D., PE, CDM Smith

Date: *September 28, 2018*

Subject: *Summary of Oversight of Cap Inspection at River Mile 10.9*
September 10–11, 2018
Lower Passaic River Restoration Project

On behalf of the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE), Kansas City District, CDM Federal Programs Corporation (CDM Smith) traveled to the River Mile (RM) 10.9 removal area on September 10 and 11, 2018 and provided field technical oversight for the annual visual inspection of the sediment cap. A visual inspection was attempted from shore on September 10, 2018, but was unsuccessful due to elevated water levels covering the cap. Poling was conducted by boat on September 11, 2018 along 12 transects across the cap at 10-foot intervals to confirm the presence of the armor layer below the overlying sediments and to measure the depth to these overlying soft sediments and the depth to armor layer from the water surface. Armor layer thicknesses were not assessed during the inspection.

Transects A through J were perpendicular to the shore with these ten transects intercepting the 2016 SPME sampler stations. The other two transects (X and Y) were located at the upstream and downstream ends of the cap, respectively, and were also perpendicular to the shore. Field activities were conducted by AECOM and Ocean Surveys, Inc. (OSI) on behalf of the Cooperating Parties Group (CPG).

The transects are presented in Figure 1 and are the same as the transects utilized during the 2017 inspection event. The poling points displayed in Figure 1 are from the August 2017 (not 2018) cap inspection and are provided for historical reference purposes only. GPS coordinates of the September 10-11, 2018 cap inspection poling points have not yet been received from the CPG as of the date of this memorandum. Photographs of field activities are presented in Attachment 1. A copy of the field logbook notes is provided in Attachment 2.

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Summary of September 10, 2018 Field Activities

Personnel in Attendance

Yeqing Liu – CDM Smith
Andrew Bullard – CDM Smith (left approximately 15:40)
Diane Salkie – EPA (left approximately 16:25)
Rob Law – de maximis, inc. (left approximately 14:00)
Helen Jones – AECOM

AECOM indicated OSI was subcontracted to conduct the poling by boat and was using this day to set up survey equipment and survey benchmarks to prepare for the poling activities the following day. CDM Smith did not observe any OSI activities but AECOM noted OSI was setting up on their boat in Passaic River.

AECOM attempted to conduct a visual inspection of the cap from the shore at 13:45. However, the river water level was too high to observe the cap. The elevated water levels were likely due to heavy rains on this day. At 14:55, AECOM again attempted to conduct a visual inspection. The river water level had lowered noticeably but the cap still could not be observed. Visual inspections were again attempted at 16:02 and 16:40 but the cap was still not visible due to the elevated water levels caused by the rain on this day. Although low tide was not until 16:50, AECOM concluded the cap would not be exposed enough to conduct proper visual inspections due to the elevated water levels caused by the rain. AECOM stated that visual observations would be conducted by boat on the following day.

Summary of September 11, 2018 Field Activities

Personnel in Attendance

Yeqing Liu – CDM Smith
Helen Jones – AECOM
Ken Cadmus – OSI
Mike *surname unknown* – OSI
John Rolfe – de maximis, inc. (observed from shore)

AECOM provided instruction and direction as their subcontractor, OSI conducted the probing/poling from a motorized boat. At 08:25, OSI first steered the boat to the survey benchmark established the previous day at the Avondale Bridge (at approximately RM10.3) to check GPS calibrations and measure the water level. OSI then proceeded to probe/pole approximately four (4) to nine (9) points starting from the shore-side edge of the cap at all transects (A, B, C, D, E, F, G, H, I, J, Y, and X) in the morning while the tide was still high. OSI collected one measurement point every 10 feet along each transect, progressing towards the river channel from the shore. After the initial four to nine measurement points had been taken at each transect, OSI continued collecting measurements (10 feet apart along each transect) until at least two points were attempted outside of the channel-side edge of the cap based on the GPS location in relation to the as-constructed cap map. At least one of the two points at each transect was confirmed to be off-cap (i.e. probing/poling did not detect presence of armor layer or geotextile). A full set of measurement points was completed at each transect by boat[1]. These measurements and associated notes are presented chronologically in Table 1.

Depth from the water surface to the top of overlying sediment was measured with a rigid plastic telescoping measuring pole with a flat disk-shaped bottom. The flat bottom allowed the measuring pole to rest on the sediment surface while the measurement was taken[2]. If OSI detected sand (identified as a grainy texture and gritty sound upon poling) and was able to distinguish it as a separate layer from the overlying sediment, depth to sand was also recorded. Depth from the water surface to the top of the armor layer was measured with a long metal rod affixed with measuring tape. Depth to overlying sediment and depth to armor layer were recorded for each point unless the armor layer was not present. If the armor layer was not present, depth to geofabric layer was recorded instead. At off-cap

[1] During the last inspection event in August 2017, AECOM probed on land 36 points in 3 ft by 3 ft grids near the E and G transects to further investigate areas where significant variations in depth to or presence of armor layer was observed. AECOM then used this information to evaluate uncertainties in the probing/poling results (AECOM, December 2017). Since no probing/poling was conducted on land during the September 2018 event, OSI did not replicate this grid probing. Poling a 3 ft by 3 ft grid by boat would not have been able to generate the same accuracy as probing on land.

[2] AECOM had not been able to measure depth to the sediment surface by boat during the last inspection event in August 2017.

locations, only depth to overlying sediment was recorded. At each of the edge transects (X and Y), two or three off-cap and multiple on-cap locations were recorded to delineate the northern and southern edges of the cap.

At locations where the armor layer was not detected, additional points were taken immediately north, south, east, and west of the location to delineate the extent of the missing armor layer. Areas with missing armor layer included G-1 (approximately 5-foot diameter area of less dense armor), A-11 (approximately 5-foot diameter area of missing armor), near the edge of the cap at the B transect (spotty armor), and D-13 (at most 5-foot diameter area of missing armor).

The river currents and wind were noticeably less severe than the last inspection event in August 2017. Poling was completed at all transects by 15:25. OSI navigated the boat to the Avondale Bridge to recheck the GPS calibration and measure the water level again. No issues were noted with the calibration. At 16:34, OSI returned to RM10.9 for a visual inspection of the cap. AECOM recorded a 10-minute video of the cap and river starting from Transect X and ending at Transect Y from 16:52 to 17:02. AECOM also took photos of the cap at each transect between 17:02 and 17:30. These photos were captured close to low tide (17:40).

Depth to armor layer and depth to overlying sediment layer are summarized below:

Table 1: September 11, 2018 Cap Inspection Summary

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
9:03	A	A-1	48	13	N/A	61	---
9:05	A	A-2	52.8	12.2	N/A	65	---
9:07	A	A-3	64.8	6.2	N/A	71	Location of former A-2 from Aug 2017 inspection
9:18	A	A-4	75.6	10.8	1.2	87.6	---
9:20	A	A-5	80.4	21.6	N/A	102	Location of former A-3 from Aug 2017 inspection
9:22	A	A-6	86.4	30	N/A	116.4	---
9:24	A	A-7	94.8	42	N/A	136.8	---
9:26	A	A-8	105.6	44.4	N/A	150	---
9:28	A	A-9	115.2	40.8	N/A	156	Within 4 ft of the former A-5 from Aug 2017 inspection
9:31	B	B-1	68.4	10.8	N/A	79.2	---
9:33	B	B-2	74.4	15.6	N/A	90	Felt sand but could not measure

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
9:36	B	B-3	76.8	14.4	N/A	91.2	Location of former B-2 from Aug 2017 inspection
9:38	B	B-4	86.4	14.4	N/A	100.8	---
9:39	B	B-5	91.2	16.8	N/A	108	---
9:40	B	B-6	96	33.6	N/A	129.6	---
9:41	B	B-7	102	19.2	N/A	121.2	---
9:42	B	B-8	108	28.8	N/A	136.8	---
9:49	C	C-1	44.4	6	N/A	50.4	---
9:51	C	C-2	60	8.4	N/A	68.4	---
9:52	C	C-3	66	13.2	N/A	79.2	---
9:53	C	C-4	68.4	10.8	N/A	79.2	---
9:55	C	C-5	72	14.4	N/A	86.4	Close to former C-3 from Aug 2017 inspection
9:56	C	C-6	76.8	13.2	N/A	90	Close to former C-4 from Aug 2017 inspection
9:58	C	C-7	80.4	25.2	N/A	105.6	---
10:01	C	C-8	85.2	30	N/A	115.2	Within 5 ft of the former C-5 from Aug 2017 inspection
10:03	C	C-9	93.6	9.6	N/A	103.2	---
10:07	D	D-1	72	7.2	N/A	79.2	Currently high tide
10:09	D	D-2	73.2	13.2	N/A	86.4	---
10:10	D	D-3	75.6	12	N/A	87.6	---
10:12	D	D-4	78	13.2	N/A	91.2	Location of former D-3 from Aug 2017 inspection
10:13	D	D-5	81.6	16.8	N/A	98.4	---
10:14	D	D-6	85.2	27.6	N/A	112.8	---
10:16	D	D-7	88.8	27.6	N/A	116.4	---
10:17	D	D-8	94.8	24	N/A	118.8	---
10:19	D	D-9	102	31.2	N/A	133.2	Within 6 ft of the former D-4 from Aug 2017 inspection
10:22	E	E-1	64.8	8.4	N/A	73.2	---
10:25	E	E-2	72	8.4	N/A	80.4	---
10:27	E	E-3	70.8	8.4	N/A	79.2	---
10:28	E	E-4	75.6	7.2	N/A	82.8	Close to former E-2 from Aug 2017 inspection
10:29	E	E-5	76.8	10.8	N/A	87.6	---

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
10:30	E	E-6	78	13.2	N/A	91.2	---
10:31	E	E-7	84	10.8	N/A	94.8	Close to former E-3 from Aug 2017 inspection
10:33	E	E-8	88.8	15.6	N/A	104.4	---
10:34	E	E-9	92.4	34.8	N/A	127.2	---
10:37	F	F-1	66	---	N/A	ND	Possibly off-cap location (start of transect). Close to former F-1 from Aug 2017 inspection.
10:39	F	F-2	68.4	7.2	N/A	75.6	---
10:41	F	F-3	72	10.8	N/A	82.8	---
10:42	F	F-4	74.4	12	N/A	86.4	---
10:43	F	F-5	75.6	14.4	N/A	90	---
10:44	F	F-6	78	16.8	N/A	94.8	Close to former F-4 from Aug 2017 inspection where spotty armor was previously observed. OSI probed around this current location (F-6) to look for any areas of spotty armor but found the armor layer to be present in the surrounding area.
10:47	F	F-7	82.8	12	N/A	94.8	---
10:49	F	F-8	81.6	---	N/A	ND	No armor layer detected, geotextile fabric at 100.8 inches. Probing around the area revealed armor layer present at around 98.4 inches within 1 foot of the missing armor.
10:51	F	F-9	81.6	---	N/A	ND	No armor layer detected, geotextile fabric at 106.8 inches. Probing around the area revealed armor layer present at around 102 inches within 0.5 foot of the missing armor.

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
10:57	G	G-1	73.2	4.8	N/A	78	Close to former G-1 from Aug 2017 inspection where spotty armor was previously observed. OSI probed around this current location to look for any areas of spotty armor and encountered missing armor (geotextile fabric at 81.6 inches) within a 5-foot area. OSI indicate the armor stones in this area were less dense and the metal poling rod was able to push between the armor stones.
11:02	G	G-2	79.2	10.8	N/A	90	---
11:03	G	G-3	84	14.4	N/A	98.4	Close to former G-2 from Aug 2017 inspection
11:12	G	G-4	90	4.8	N/A	94.8	---
11:13	G	G-5	93.6	18	N/A	111.6	---
11:14	G	G-6	97.2	---	N/A	ND	No armor layer detected, geotextile fabric at 175.2 inches. Probing around the area revealed armor layer present at around 115.2 inches within 1 foot of the missing armor. OSI indicated the metal poling rod likely pushed between the armor stones at first measurement point.
11:16	G	G-7	96	22.8	N/A	118.8	---
11:18	G	G-8	100.8	20.4	N/A	121.2	---
11:21	H	H-1	57.6	1.2	N/A	58.8	Close to former H-1 from Aug 2017 inspection
11:23	H	H-2	73.2	8.4	N/A	81.6	---
11:24	H	H-3	94.8	6	N/A	100.8	Close to former H-2 from Aug 2017 inspection
11:26	H	H-4	105.6	12	N/A	117.6	Close to former H-3 from Aug 2017 inspection

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
11:28	H	H-5	115.2	15.6	N/A	130.8	---
11:30	H	H-6	118.8	22.8	N/A	141.6	Within 5 ft of the former H-4 from Aug 2017 inspection
11:32	H	H-7	121.2	24	N/A	145.2	
11:35	I	I-1	88.8	8.4	N/A	97.2	Close to former I-2 from Aug 2017 inspection
11:36	I	I-2	98.4	14.4	N/A	112.8	Close to former I-1 and I-3 from Aug 2017 inspection
11:38	I	I-3	106.8	9.6	N/A	116.4	---
11:39	I	I-4	117.6	27.6	N/A	145.2	---
11:40	I	I-5	126	22.8	N/A	148.8	---
12:04	J	J-1	74.4	10.8	N/A	85.2	Close to former J-1 from Aug 2017 inspection
12:05	J	J-2	92.4	21.6	N/A	114	---
12:07	J	J-3	111.6	28.8	N/A	140.4	---
12:08	J	J-4	130.8	25.2	N/A	156	---
12:12	Y	Y-1	99.6	6	N/A	105.6	---
12:14	Y	Y-2	145.2	20.4	N/A	165.6	May have been depth to hardpan instead of armor. Difficult to tell poling from the boat.
12:16	Y	Y-3	154.8	12	N/A	166.8	May have been depth to hardpan instead of armor. Difficult to tell poling from the boat.
12:17	Y	Y-4	152.4	25.2	N/A	177.6	May have been depth to hardpan instead of armor. Difficult to tell poling from the boat.
12:31	X	X-1	40.8	9.6	N/A	50.4	Close to former X-1 from Aug 2017 inspection
12:32	X	X-2	49.2	9.6	N/A	58.8	Close to former X-2 from Aug 2017 inspection
12:34	X	X-3	52.8	20.4	N/A	73.2	---
12:35	X	X-4	64.8	14.4	N/A	79.2	Within 5 ft of the former X-4 from Aug 2017 inspection
12:37	X	X-5	69.6	26.4	N/A	96	---
12:38	X	X-6	70.8	---	N/A	ND	No armor (off-cap)

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
12:39	X	X-7	74.4	42	N/A	116.4	---
12:40	X	X-8	78	---	N/A	ND	No armor (off-cap)
12:41	X	X-9	82.8	42	N/A	124.8	---
12:47	X	X-10	91.2	44.4	N/A	135.6	---
12:48	X	X-11	104.4	---	N/A	ND	No armor (off-cap)
12:49	X	X-12	105.6	---	N/A	ND	No armor (off-cap)
12:51	X	X-13	121.2	34.8	N/A	156	---
12:53	X	X-14	139.2	111.6	N/A	250.8	Depth to armor layer measured with extension attached to metal poling rod. Was difficult to pole at this location and is possibly off-cap.
13:01	X	X-15	165.6	---	N/A	ND	Depth to sediment surface measured with a measuring tape attached to a weight plate because the telescoping measuring pole was too short. No armor (off-cap).
13:06	A	A-10	111.6	32.4	N/A	144	---
13:07	A	A-11	121.2	---	N/A	ND	No armor layer detected, geotextile fabric at 166.8 inches. Probing around the area revealed armor layer present at around 166.8 inches within 5 feet of the missing armor.
13:10	A	A-12	138	54	N/A	192	---
13:13	A	A-13	186	---	N/A	ND	No armor (off-cap)
13:21	B	B-9	91.2	---	N/A	ND	No armor layer detected, geotextile fabric at 132 inches. Probing around the area revealed armor layer missing within a 5-foot diameter circle around the B-9 location.
13:23	B	B-10	91.2	37.2	N/A	128.4	---
13:24	B	B-11	88.8	46.8	N/A	135.6	---

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
13:25	B	B-12	110.4	---	N/A	ND	No armor layer or geotextile fabric detected. However, this location is towards the channel-side edge of the cap. Close to former B-7 from Aug 2017 inspection.
13:27	B	B-13	121.2	27.6	N/A	148.8	Follow-up location near B-12 (to investigate area of missing armor layer and geotextile)
13:29	B	B-14	132	---	N/A	ND	No armor (off-cap)
13:32	B	B-15	117.6	---	N/A	ND	Follow-up location near B-12. No armor layer detected, geotextile fabric at 144 inches. Probing around the area revealed armor layer present at around 135.6 inches nearby. OSI speculated that this area (around B-12) was a likely a transition area (more spotty areas of missing armor layer or cap) since it was close to the channel-side edge of the cap
13:36	C	C-10	62.4	28.8	N/A	91.2	---
13:38	C	C-11	70.8	36	N/A	106.8	---
13:40	C	C-12	79.2	34.8	N/A	114	Within 5 ft of the former C-9 from Aug 2017 inspection
13:41	C	C-13	90	36	N/A	126	---
13:43	C	C-14	96	42	N/A	138	Close to former C-7 from Aug 2017 inspection
13:44	C	C-15	104.4	---	N/A	ND	No armor layer detected, geotextile fabric at 146.4 inches. However, location was considered close enough to the channel-side edge of the cap to be potentially off-cap.

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
13:46	C	C-16	121.2	---	N/A	ND	No armor (off-cap)
14:04	D	D-10	67.2	37.2	N/A	104.4	---
14:06	D	D-11	74.4	31.2	N/A	105.6	---
14:07	D	D-12	85.2	33.6	N/A	118.8	---
14:08	D	D-13	92.4	---	N/A	ND	No armor layer detected, geotextile fabric at 132 inches. Close to former D-7 from Aug 2017 inspection.
14:10	D	D-14	94.8	31.2	N/A	126	---
14:12	D	D-15	106.8	26.4	N/A	133.2	---
14:13	D	D-16	115.2	---	N/A	ND	No armor (off-cap). Sandy, gravelly texture felt below the sediment layer but was not measurable.
14:15	D	D-17	120	---	N/A	ND	No armor (off-cap)
14:17	D	D-18	93.6	34.8	N/A	128.4	Follow-up location near D-13
14:19	D	D-19	90	18	N/A	108	Follow-up location near D-13
14:21	D	D-20	86.4	37.2	N/A	123.6	Follow-up location near D-13. Further probing near D-13 was conducted to delineate the size of the missing armor area. About a 5-foot diameter circle of missing armor was determined to be located around D-13.
14:26	E	E-10	50.4	---	N/A	ND	No armor layer detected, geotextile fabric at 84 inches. Armor layer was felt right next to the metal poling rod at 73.2 inches. OSI speculated the poling rod likely hit between two armor stones.
14:28	E	E-11	55.2	28.8	N/A	84	---
14:29	E	E-12	63.6	48	N/A	111.6	---
14:31	E	E-13	70.8	38.4	N/A	109.2	---

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
14:33	E	E-14	82.8	38.4	N/A	121.2	---
14:34	E	E-15	105.6	---	N/A	ND	No armor (off-cap). Close to former E-6 from Aug 2017 inspection.
14:36	E	E-16	117.6	---	N/A	ND	No armor (off-cap)
14:39	F	F-10	32.4	20.4	N/A	52.8	---
14:40	F	F-11	34.8	28.8	N/A	63.6	---
14:42	F	F-12	38.4	38.4	N/A	76.8	---
14:43	F	F-13	46.8	39.6	N/A	86.4	---
14:44	F	F-14	56.4	30	N/A	86.4	---
14:45	F	F-15	66	33.6	N/A	99.6	---
14:46	F	F-16	80.4	32.4	N/A	112.8	---
14:50	F	F-17	92.4	---	N/A	ND	No armor (off-cap)
14:51	F	F-18	112.8	---	N/A	ND	No armor (off-cap)
14:55	G	G-9	49.2	32.4	N/A	81.6	---
14:56	G	G-10	55.2	38.4	N/A	93.6	---
14:57	G	G-11	63.6	---	N/A	ND	No armor (off-cap)
14:58	G	G-12	74.4	---	N/A	ND	No armor (off-cap)
15:01	H	H-8	68.4	---	N/A	ND	No armor layer detected, geotextile fabric at 117.6 inches. Since this location is off-cap (outside of the cap boundary according to GPS), no delineation was conducted
15:02	H	H-9	74.4	---	N/A	ND	No armor (off-cap)
15:05	I	I-6	84	21.6	N/A	105.6	---
15:06	I	I-7	91.2	---	N/A	ND	No armor (off-cap).
15:09	I	I-8	96	---	N/A	ND	Poling hit something hard at 152.4 inches. However, this location is off-cap (outside of the cap boundary according to GPS), thus it is likely not armor stone.
15:13	J	J-5	97.2	21.6	N/A	118.8	---
15:14	J	J-6	111.6	---	N/A	ND	No armor (off-cap)

Time	Transect	Location	Depth to Sediment from Water Surface (in)	Thickness of Sediment Layer (in)	Thickness of Sand Layer Underlying Sediment (in)	Depth to Armor Layer from Water Surface (in)	Comment
15:15	J	J-7	118.8	---	N/A	ND	No armor (off-cap)
15:18	Y	Y-5	124.8	3.6	N/A	128.4	---
15:20	Y	Y-6	145.2	10.8	N/A	156	---
15:21	Y	Y-7	145.2	40.8	N/A	186	---
15:23	Y	Y-8	144	---	N/A	ND	No armor (off-cap)

N/A – Not Available; indicates when OSI was unable to measure the sand layer as a distinct, separate layer from the overlying soft sediment.

ND – Not Detected; indicates the armor layer was not detected at the location.

Figure 1

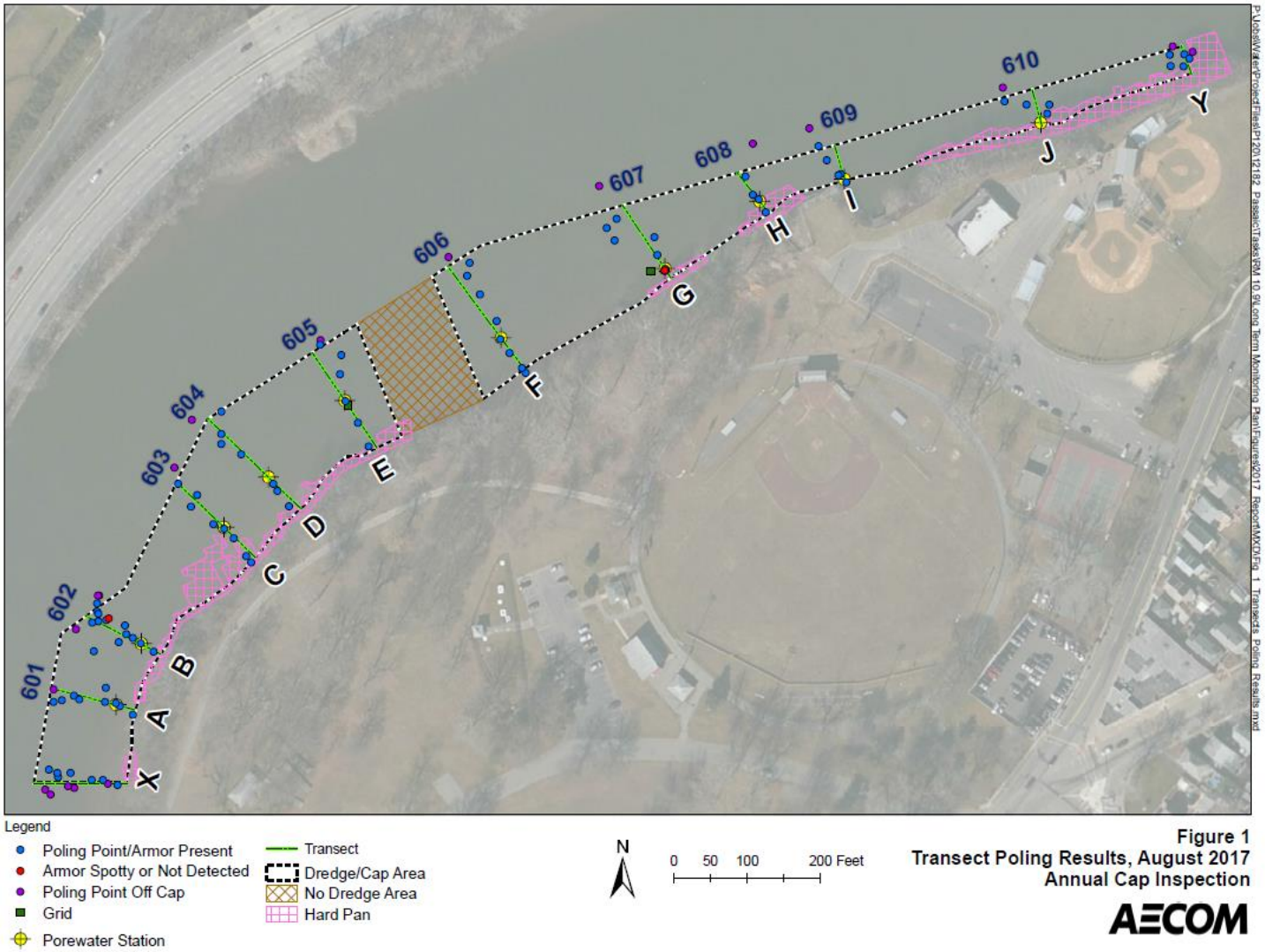


Figure 1: Figure of poling/probing transects and sampler stations. Poling points displayed are from the August 21-22, 2017 cap inspection event. NOTE: An update to this figure with the poling points from the September 10-11, 2018 cap inspection will be created when the GPS coordinates of the September 2018 cap inspection are received from the CPG.

Attachment 1
Photographs of Field Activities

Photograph 1: Area of Transects G and H facing north (near low tide)

9/10/2018

Photograph 2: Area of Transect F facing north (near low tide)

9/10/2018

Photograph 3: Measuring depth to water surface from survey benchmark at Avondale Bridge

9/11/2018

Photograph 4: Measuring depth to sediment with telescoping measuring pole at D-1 location

9/11/2018

Photograph 5: Measuring depth to armor layer with long metal rod at D-1 location

9/11/2018

Photograph 6: Southern edge of cap around Transect X (facing northeast)

9/11/2018

Photograph 7: Approximate area of Transect A (facing northeast)

9/11/2018

Photograph 8: Approximate area of Transects C and D (facing east)

9/11/2018

Photograph 9: Approximate area of Transect F from utility corridor (facing northeast)

9/11/2018

Photograph 10: Area of Transect H and adjacent boat ramp (facing east)

9/11/2018

Photograph 11: Area of Transect I (facing southeast)

9/11/2018

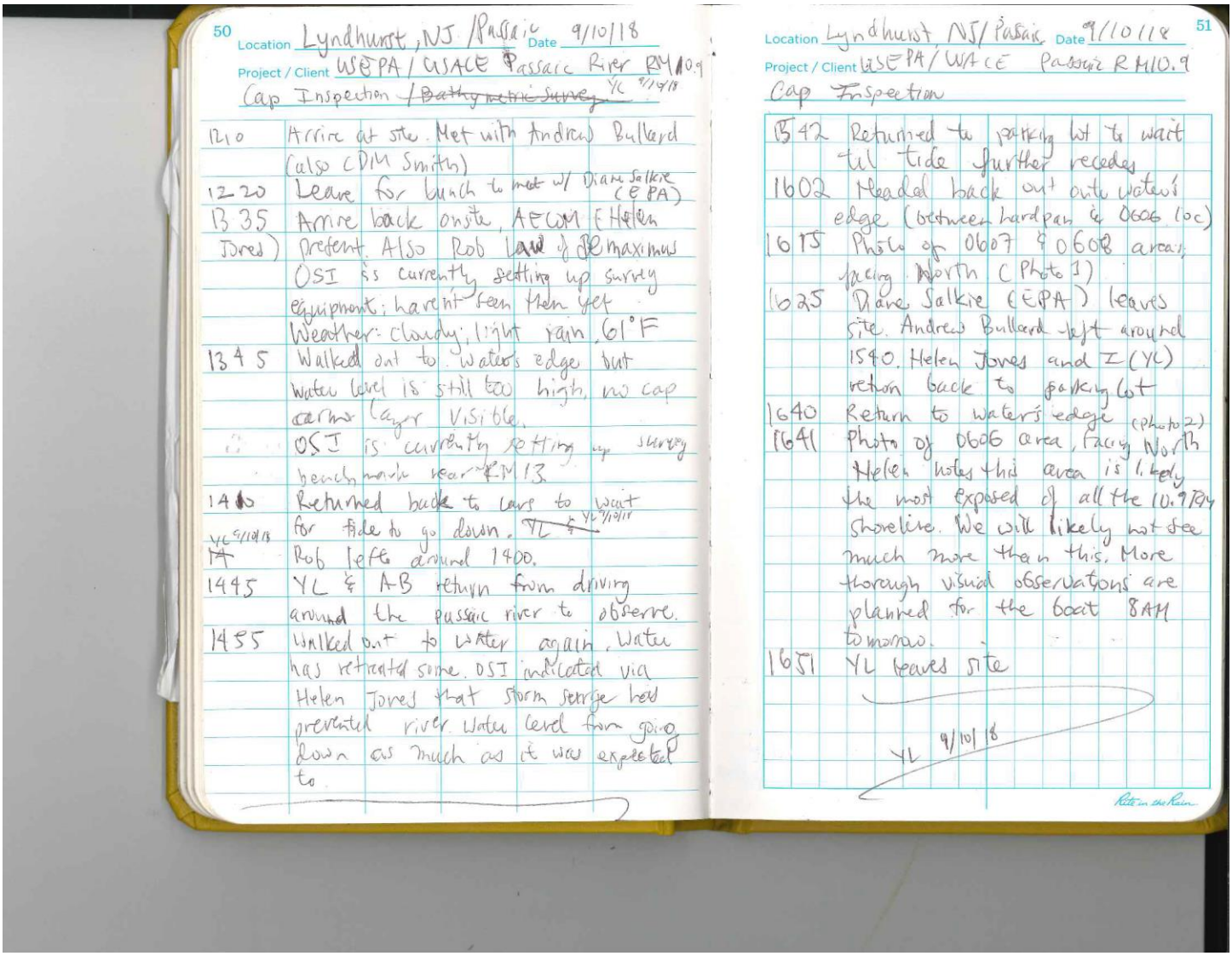
Photograph 12: Area of Transect B with fallen tree branch (facing southeast)

9/11/2018

Photograph 13: Mudflats between Transects B and C (facing east)

9/11/2018

Attachment 2
Field Logbook Notes



50

Location Lyndhurst, NJ / Passaic Date 9/10/18

Project / Client USEPA / USACE Passaic River RM 10.9

Cap Inspection ~~/ Bathymetric Survey~~ YC 9/14/18

1210	Arrive at site. Met with Andrew Bullard (also CDM Smith)
1220	Leave for lunch to meet w/ Diane Salkie (EPA)
1335	Arrive back onsite, AECOM (Helen Jones) present. Also Rob Land of Maximus OSI is currently setting up survey equipment; haven't seen Helen yet. Weather: cloudy, light rain, 61°F
1345	Walked out to waters edge but water level is still too high, no cap cover layer visible. OSI is currently setting up survey bench mark near RM 13
1410	Returned back to cars to wait for tide to go down. YL & YC 9/10/18
YC 9/10/18 IA	Rob left around 1400.
1445	YL & AB return from driving around the Passaic river to observe.
1455	Walked out to water again. Water has retreated some. OSI indicated via Helen Jones that storm surge had prevented river water level from going down as much as it was expected to.

Location Lyndhurst, NJ / Passaic Date 9/10/18 51

Project / Client USEPA / WATCE Passaic RM 10.9

Cap Inspection

1542	Returned to parking lot to wait til tide further recedes
1602	Headed back out onto waters edge (between hardpan & 0606 (oc)
1615	Photo of 0607 & 0608 areas facing North (Photo 1)
1625	Diane Salkie (EPA) leaves site. Andrew Bullard left around 1540. Helen Jones and I (YL) return back to parking lot
1640	Return to waters edge (photo 2)
1641	Photo of 0606 area, facing North Helen notes this area is likely the most exposed of all the 10.9 RM shoreline. We will likely not see much more than this. More thorough visual observations are planned for the boat 8AM tomorrow.
1651	YL leaves site

YL 9/10/18

Rite in the Rain

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Location Lyndhurst, NJ / Passaic Date 9/11/18

Project / Client USEPA / USACE Passaic RM 10.9

Cap Inspection

805	YL arrived onsite. Helen Jones (AECOM) Ken & Mike (OSI) are already present at site setting up boat behind meadowlands gym at dock.
yl 9/11/18	
	Weather cloudy & foggy, 61°F. expected to get up to almost 80°F later today
820	H&S meeting stay clear of poling rod and keep away from edges of boat. Leave water if thunderstorming.
825	Boat headed to survey benchmark to check calibration. Goal is to start at transects closest to shore while tide is higher. Helen indicates Jon Ralph is observing from the shore at the park.
845	Reached survey benchmark at Park Ave bridge around RM 9.5 for calibration (Photo 3). Will be measuring top of sediment (water depth) & top of armor at each location
903	At transect A. Depth to [illegible] 4 ft Depth to Armor 5'5" A-1
905	A-2 Depth to water 4.4 ft. Armor:
907	A-3 (old A-2 in 2017) 5.4 ft (to [illegible]), 5'11" ft

Location Lyndhurst, NJ / Passaic Date 9/11/18 53

Project / Client USEPA / USACE Passaic RM 10.9

Cap Inspection

912	Fixing measuring tape on poling rod. Goal is to get a point measurement every 10 ft along a transect. Will finish 1 full transect first (A) and then do first 4 points of every remaining transect during high tide (in 1 hour)
918	A-4 (old A-3 in 2017) 6.3 ft to sed 9/11/18 yl, 7.2 ft to sand, 7.3 ft to armor
920	A-5 6.7 ft to sed 9/11/18 yl, 8.5 ft to armor (old A-4 in 2017)
922	A-6 (not close to any old points) 7.2 ft to sed, 9.7 ft to armor
924	A-7, 7.9 ft to sed, 11.9 ft to armor
926	A-8, 8.8 ft to sed, 12.5 ft to armor
928	A-9, 9.6 ft to sed, 13 ft to armor (within 4 ft of old A-5)
931	B-1, 5.7 ft to sed, 6.6 ft to armor
933	B-2, 6.2 ft to sediment, 7.5 ft to armor (felt sand)
936	B-3 (on old B-2), 6.4 ft to sediment yl 9/11/18, 7.6 ft to armor

Rain on the Rain

Location Lyndhurst, NJ / Passaic Date 9/11/18
Project / Client USEPA/USACE Passaic RM 10.9
Cap Inspection

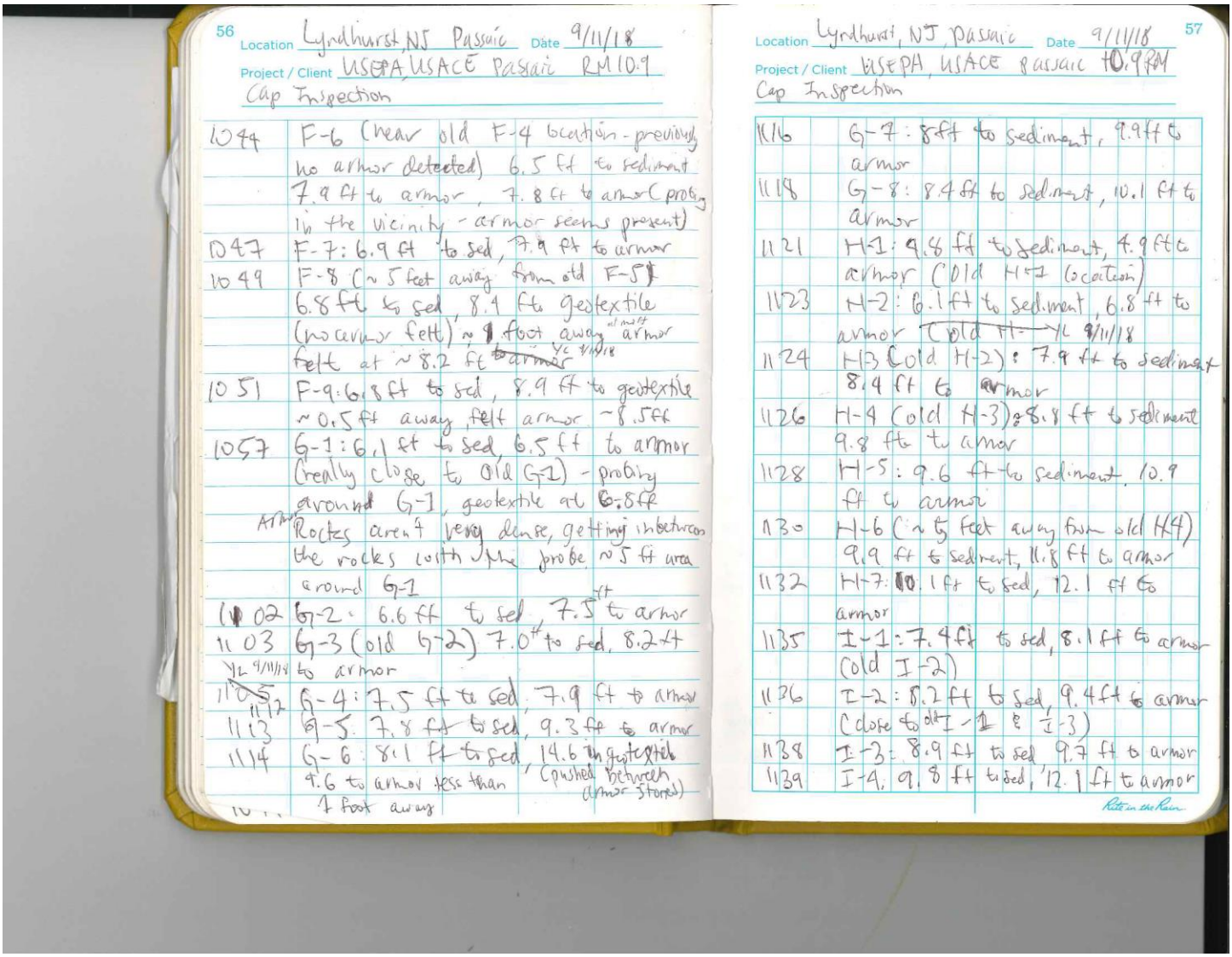
938	B-9 7.2 ft to sediment. 8.4 ft to armor
939	B-5 7.6 ft to sediment, 9 ft to armor
940	B-6 8.0 ft to sed, 10.8 ft to armor
941	B-7 ~~8~~.5 ft to sed, 10.1 ft to armor
942	B-8 9 ft to sed 11.4 ft to armor
949	C-1 3.7 ft to sed, 4.2 ft to armor
951	C-2 5 ft to sed, 5.7 ft to armor
952	C-3 5.5 ft to sed, 6.6 ft to armor
953	C-4 5.7 ft to sed, 6.6 ft to armor
955	C-5 (close to old C-3) 6 ft to sed
	7.2 ft to armor
956	C-6 (close to old C-4) 6.4 ft to sed
	7.5 ft to armor
958	C-7, 6.7 ft to sed, 8.5 ft to armor
1001	C-8 (close to old C-5, ~5 feet away)
	7.1 ft to sed, 9.6 ft to armor
1003	C-9, 7.8 ft to sed, 8.6 ft to armor
1007	currently at high tide. D-1
	6 ft to sed, 6.6 ft to armor (photos 4 & 5)
1009	D-2 6.1 ft to sed 7.2 ft to armor
1010	D-3 6.3 ft to sed, 7.3 ft to armor
1012	D-4 (old D-3 location in 2017)
~~1012~~	~~D-5~~ YC 9/11/18, 6.5 ft to sed 7.6 ft to armor
1013	D-5, 6.8 ft to sed, 8.2 ft to armor
1014	D-6 7.1 ft to sed, 9.4 ft to armor

Location Lyndhurst, NJ / Passaic Date 9/11/18
Project / Client USEPA/USACE Passaic RM 10.9
Cap Inspection

1016	D-7: 7.4 ft to sed, 9.7 ft to armor
1017	D-8 7.9 ft to sed, 9.9 ft to armor
1019	D-9 8.5 ft to sed, 11.1 ft to armor
	(6 ft to old D-4)
1022	E-1: 5.4 ft to sed, 6.1 ft to armor
1025	E-2: 6 ft to sed, 6.7 ft to armor
1027	E-3: 5.9 ft to sed, 6.6 ft to armor
1028	E-4 (near old E-2 from 2017)
	6.3 ft to sed, 6.9 ft to armor
1029	E-5 6.4 ft to sed, 7.3 ft to armor
1030	E-6 6.5 ft to sed, 7.6 ft to armor
1031	E-7 (near old E-3 from 2017)
	7 ft to sed, 7.9 ft to armor
1033	E-8: YC 9/11/18 7.4 ft to sed, 8.7 ft to armor
1034	E-9: 7.7 ft to sed, 10.6 ft to armor
1037	F-1 (near old F-1) 5.5 ft to sediment,
	(no armor felt) ~~6.8 ft~~ YC 9/11/18
	likely off cap location → old (F-2 / 1-4)
1039	F-2: 5.7 ft to sed, 6.3 ft to armor
1041	F-3: 6 ft to sed, 6.9 ft to armor
1042	F-4: 6.2 ft to sed, 7.2 ft to armor
	(near old F-3)
1042	F-5: 6.3 ft to sed, 7.5 ft to armor

Rite

Subject to Attorney Client, Work Product, and /or Deliberative Process Privileges, and the Joint Prosecution and Confidentiality Agreement; Not for Public Release; FOIA/OPRA Exempt



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Location Lyndhurst, NJ Passaic Date 9/11/18
Project / Client USEPA, USACE Passaic RM 10.9
Cap Inspection

1044	F-6 (near old F-4 location - previously no armor detected) 6.5 ft to sediment 7.9 ft to armor, 7.8 ft to armor (probing in the vicinity - armor seems present)
1047	F-7: 6.9 ft to sed, 7.9 ft to armor
1049	F-8 (~5 feet away from old F-5) 6.8 ft to sed, 8.1 ft to geotextile (no armor felt) ~1 foot away from armor felt at ~8.2 ft to armor YC 9/11/18
1051	F-9: 6.8 ft to sed, 8.9 ft to geotextile ~0.5 ft away, felt armor ~8.5 ft
1057	G-1: 6.1 ft to sed, 6.5 ft to armor (really close to old G-1) - probing around G-1, geotextile at 6.8 ft. Armor Rocks aren't very dense, getting in between the rocks with the probe ~5 ft area around G-1
1102	G-2: 6.6 ft to sed, 7.5 ft to armor
1103	G-3 (old G-2) 7.0 ft to sed, 8.2 ft to armor YC 9/11/18
1105 1117	G-4: 7.5 ft to sed, 7.9 ft to armor
1113	G-5: 7.8 ft to sed, 9.3 ft to armor
1114	G-6: 8.1 ft to sed, 14.6 in geotextile (pushed between armor stones) 9.6 to armor less than 1 foot away

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Location Lyndhurst, NJ, Passaic Date 9/11/18
Project / Client USEPA, USACE Passaic RM 10.9
Cap Inspection

1116	G-7: 8 ft to sediment, 9.9 ft to armor
1118	G-8: 8.4 ft to sediment, 10.1 ft to armor
1121	H-1: 9.8 ft to sediment, 4.9 ft to armor (old H-1 location)
1123	H-2: 6.1 ft to sediment, 6.8 ft to armor (old H-1) YC 9/11/18
1124	H-3 (old H-2): 7.9 ft to sediment 8.4 ft to armor
1126	H-4 (old H-3): 8.8 ft to sediment 9.8 ft to armor
1128	H-5: 9.6 ft to sediment, 10.9 ft to armor
1130	H-6 (~5 feet away from old H-4) 9.9 ft to sediment, 11.8 ft to armor
1132	H-7: 10.1 ft to sed, 12.1 ft to armor
1135	I-1: 7.4 ft to sed, 8.1 ft to armor (old I-2)
1136	I-2: 8.2 ft to sed, 9.4 ft to armor (close to old I-1 & I-3)
1138	I-3: 8.9 ft to sed 9.7 ft to armor
1139	I-4, 9.8 ft to sed, 12.1 ft to armor

Rite in the Rain

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Location Lyndhurst NJ Passaic Date 9/11/18

Project / Client USEPA, USACE Passaic RM 10.9

CAP inspection

1140	I-5 : 10.5 ft to Sed, 12.4
1145	Bathroom break
1201	Heading back out to Transect J
1204	J-1 (close to old J-1) 6.2 ft to sediment, 7.1 ft to armor
1205	J-2 : 7.7 ft to sediment, 9.5 ft to armor
1207	J-3 : 9.3 ft to sediment, 11.7 ft to armor
1208	J-4 : 10.9 ft to sediment, 13 ft to armor
1212	Y-1 : 8.3 ft to sediment, 8.8 ft to armor
1214	Y-2 : 12.1 ft to sediment, 13.8 ft to armor
1216	Y-3 12.9 ft to sediment, 13.9 ft to armor close to shore for Y-2 & Y-3 (could also possibly be hard pan)
1217	Y-4 : 12.7 ft to sediment, 14.8 ft to armor or hardpan? (likely that Y-2, Y-3, & Y-4 hit hardpan, not armor. Difficult to tell with the probe from the boat)
1231	X-1 : 3.4 ft to sediment, 4.2 ft to armor (on former X-1)
1232	X-2 : 4.1 ft to sediment, 4.9 ft to armor (on former X-2)

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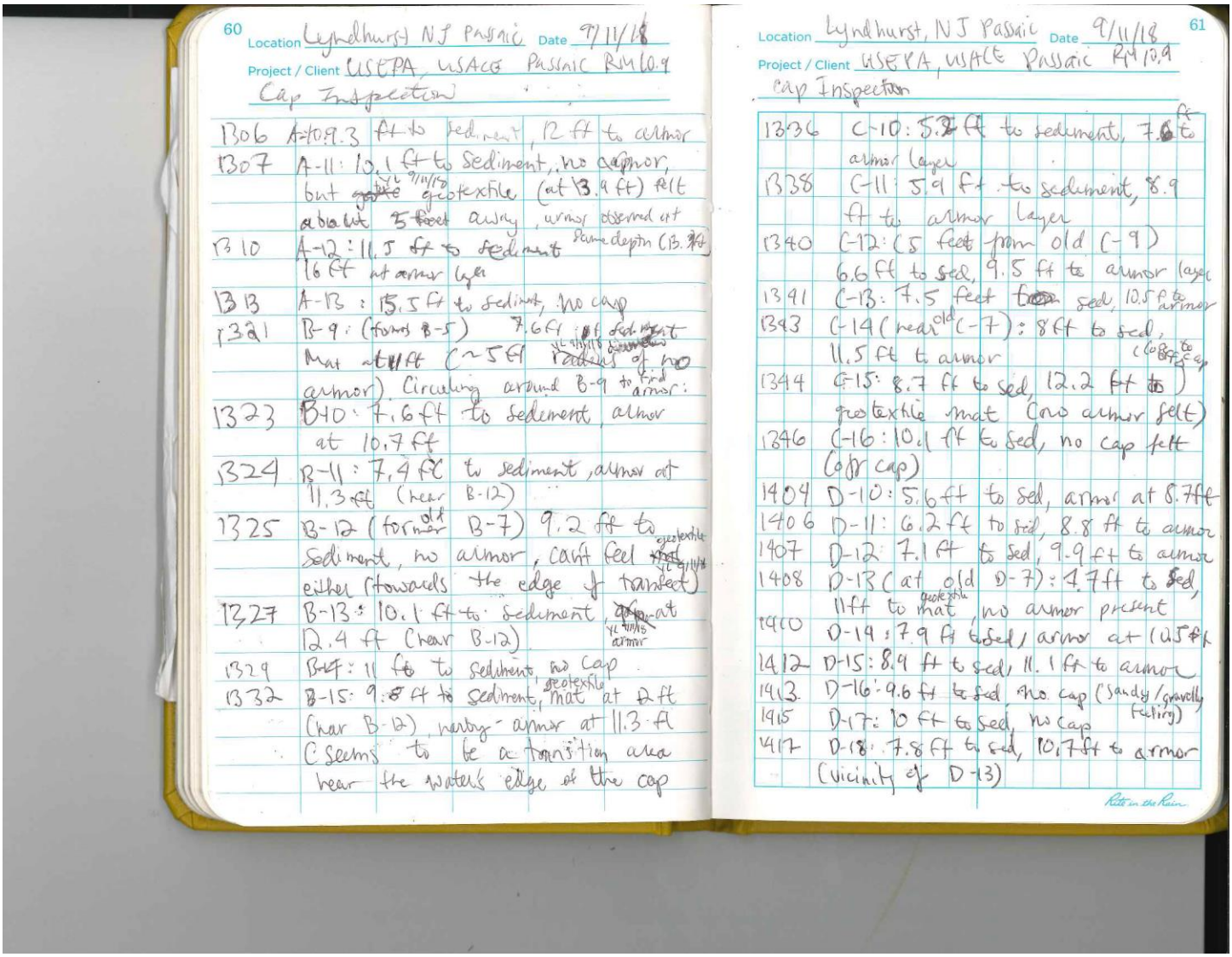
Location Lyndhurst, NJ Passaic Date 9/11/18

Project / Client USEPA, WACE Passaic RM 10.9

Cap Inspection

1234	X-3 : 4.4 ft to sediment, 6.1 ft to armor
1235	X-4 : 5.9 ft to sediment, 6.6 ft to armor (~5 feet away from old X-4)
1237	X-5 : 5.8 ft to sediment, 8 ft to armor
1238	X-6 : 5.9 ft to sediment, no cap
1239	X-7 : 6.2 ft to sediment, 9.7 ft to armor
1240	X-8 : 6.5 ft to sediment, no cap
1241	X-9 : 6.9 ft to sed, 10.4 ft to armor
1247	X+10 7.6 ft to sed, 11.3 ft to armor
1248	X+11 : 8.7 ft to sediment, no cap
1249	X+12 : 8.8 ft to sediment, no cap
1251	X+13 : 10.1 ft to sediment, 13 ft to armor
1253	X-14 : 11.6 ft to sed, ran out of pole. Hacking extension ~~& redoing measurement~~ YC 9/11/18, 20.9 ft to armor? possibly old cap here.
1301	X-15 : 13.8' to sediment (switched to measuring tape + stove rather than rod) No cap

Rain on the Rain



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Location Lyndhurst NJ Passaic Date 9/11/18

Project / Client USEPA, USACE Passaic RM 10.9 Cap Inspection

1306 A-10.3 ft to sediment, 12 ft to armor

1307 A-11: 10.1 ft to sediment, no cap/armor, but geotextile (at 13.9 ft) felt about 5 feet away, armor observed at same depth (13.9 ft) 16 ft at armor layer

1310 A-12: 11.5 ft to sediment

1313 A-13: 15.5 ft to sediment, no cap

1321 B-9: (formerly B-5) 7.6 ft to sediment mat at 11 ft (~5 ft radius of no armor). Circling around B-9 to find armor:

1323 B-10: 7.6 ft to sediment, armor at 10.7 ft

1324 B-11: 7.4 ft to sediment, armor at 11.3 ft (near B-12)

1325 B-12 (former B-7) 9.2 ft to sediment, no armor, can't feel geotextile either towards the edge of transect

1327 B-13: 10.1 ft to sediment, armor at 12.4 ft (near B-12)

1329 B-14: 11 ft to sediment, no cap

1332 B-15: 9.8 ft to sediment, mat at 2 ft (near B-12) nearby armor at 11.3 ft

C seems to be a transition area near the water's edge of the cap

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Location Lyndhurst, NJ Passaic Date 9/11/18

Project / Client USEPA, USACE Passaic RM 10.9 Cap Inspection

1336 C-10: 5.8 ft to sediment, 7.8 ft to armor layer

1338 C-11: 5.9 ft to sediment, 8.9 ft to armor layer

1340 C-12: (5 feet from old C-9) 6.6 ft to sed, 9.5 ft to armor layer

1341 C-13: 7.5 feet to sed, 10.5 ft to armor

1343 C-14 (near old C-7): 8 ft to sed, 11.5 ft to armor (no geotextile cap)

1344 C-15: 8.7 ft to sed, 12.2 ft to geotextile mat (no armor felt)

1346 C-16: 10.1 ft to sed, no cap felt (off cap)

1404 D-10: 5.6 ft to sed, armor at 8.7 ft

1406 D-11: 6.2 ft to sed, 8.8 ft to armor

1407 D-12: 7.1 ft to sed, 9.9 ft to armor

1408 D-13 (at old D-7): 4.7 ft to sed, 11 ft to geotextile mat, no armor present

1410 D-14: 7.9 ft to sed, armor at 10.5 ft

1412 D-15: 8.9 ft to sed, 11.1 ft to armor

1413 D-16: 9.6 ft to sed, no cap (sandy/gravelly feeling)

1415 D-17: 10 ft to sed, no cap

1417 D-18: 7.8 ft to sed, 10.7 ft to armor (vicinity of D-13)

Rite in the Rain

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Location Lyndhurst, NJ Passaic Date 9/11/18

Project / Client USACE/USEPA Passaic RM10.9

Cap Inspection

1419	D-19: 7.5 ft to sed, 9.0 ft to armor layer (vicinity of D-18)
1421	D-20: 7.2 ft to sed, 10.3 ft to armor layer (vicinity of D-13)
1422	Continued probing of D-13 vicinity to gauge size of missing armor area. About a 5 ft diameter of missing armor area at most
1426	E-10: 4.2 ft to sed, gap: at 7 ft geotextile armor right next to at 6.1 ft. (poling rod likely hit between two armor stones)
1428	E-11: 4.6 ft to sed, armor layer at 7 ft
1429	E-12: 5.3 ft to sed, armor at 9.3 ft
1431	E-13: 5.9 ft to sed, armor at 9.1 ft
1433	E-14: 6.9 ft to sed, armor at 10.1 ft
1434	E-15: 8.8 ft to sed, ~~armor at~~ 9/12/18 no cap (close to former old E-6)
1436	E-16: 9.8 ft to sed, no cap
1439	F-10: 2.7 ft to sed, 4.4 ft to cap armor layer
1440	F-11: 2.9 ft to sed, 5.3 ft to armor layer
1442	F-12: 3.2 ft to sed, 6.4 ft to armor
1443	F-13: 3.9 ft to sed, 7.2 ft to armor
1444	F-14: 4.7 ft to sed, 7.2 ft to armor
1445	F-15: 5.5 ft to sed, 8.3 ft to armor
1446	F-16: 6.7 ft to sed, 9.4 ft to armor

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Location Lyndhurst, NJ Passaic Date 9/11/18

Project / Client USEPA/USACE Passaic RM10.9

Cap Inspection

1450	F-17: 7.7 ft to sediment, no cap
1451	F-18: 9.4 ft to sed, no cap
1455	G-9: 4.1 ft to sediment, 6.8 ft to armor
1456	G-10: 4.6 ft to sed, 7.8 ft to armor
1457	G-11: 5.3 ft to sed, no cap ~~7 ft to armor~~ VC 9/11/18
1458	G-12: 6.2 ft to sed, no cap.
1501	H-8: 5.7 ft to sed, mat geotextile 9.8 ft outside the cap boundary - so not delineating
1502	H-9: 6.2 ft to sed, no cap
1505	I-6: 7 ft to sed, 8.8 ft to cap
1506	I-7: 7.6 ft to sed, no cap
1509	I-8: 8.0 ft to sed, 12.7 ft to somewhat hard, likely not cap (off cap location)
1513	J-5: 8.1 ft to sed, 9.9 ft to armor
1514	J-6: 9.3 ft to sed, no cap
1515	J-7: 9.9 ft to sed, no cap
1518	Y-5C old Y-1 location): 10.4 ft to sediment, 10.7 ft to armor layer
1520	Y-6: 12.1 ft to sed, 13 ft to hardpan
1521	Y-7: 12.1 ft to sed, 15.5 ft to hardpan
1523	Y-8: 12 ft to sed, off cap

poling transects is completed. However low tide is not until 17:40. So visual

Rite in the Rain

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Location Lyndhurst, NJ Passaic Date 9/11/18

Project / Client USEPA/USACE Passaic RM 10.9 Cap Inspection

	observations cannot be completed yet
1546	Headed back to Park Ave bridge for a navigation check/calibration
1552	At park ave bridge to check nav.
1634	Headed back to cap to do visual observations
1650	Photo 6: southern edge of cap looking northeast (transect X)
1652	photo 7: approximate area of transect A)
1653	photo 8: transects C & D facing the shore (east)
1654	Photo 9: transects F from utility corridor, facing northeast
1658	Photo 10: area of transect H, facing east
1702	Helen (ASCOM) finishes capturing the visual observation videos of the cap
1707	Photo 11: area of transect I facing southeast)
1711	Photo 12: area of transect ~~B~~ (and tree fallen over (facing southeast)
1718	Photo 13: Close up of mudflats between Transects B & C (facing East)

Location Lyndhurst NJ Passaic Date 9/11/18

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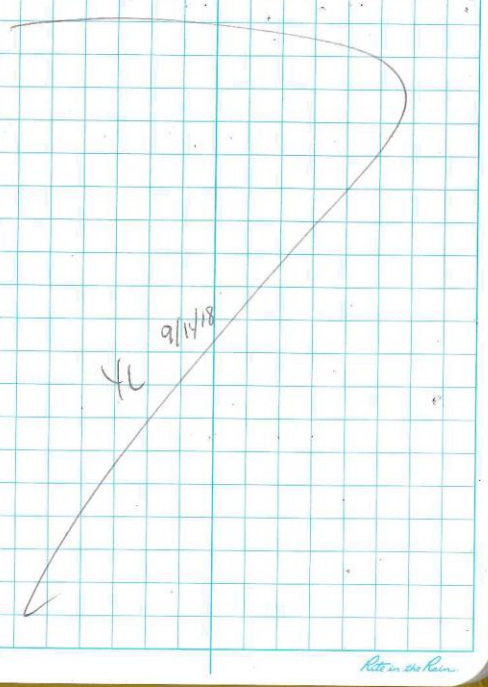
Project / Client USEPA/USACE Passaic RM 10.9 Cap Inspection

1747	Arrived back onshore
1755	YL leaves site (OSE & Helen are still demobilizing - moving equipment from boat)



Rite in the Rain